IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re:	PAYNE, Stephen A.	Examiner:	KHAN, Amina S.
Serial No.:	10/521,829	Art Unit:	1751
Filed:	August 1, 2005		
For:	DURABLE ANTIMICROBIAL LEATHER		

APPEAL BRIEF

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I. REAL PARTY IN INTEREST

The real party in interest is Microban Products Company, the assignee of record and a subsidiary of Microban International, Ltd.

II. RELATED APPEALS AND INTERFERENCES

There are no known prior and pending appeals, judicial proceedings or interferences known to Appellant which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-22, 29-30 and 36 are canceled.
Claims 23-28, 31-35 and 37-68 are rejected.
Claim 48 is canceled herein.

IV. STATUS OF AMENDMENTS

No Amendment After Final has been filed in this case.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The application as filed utilized paragraph numbering in lieu of line numbering. References within the following claim summaries therefore are made to paragraphs within the originally-filed application.

Claim 23 defines a method for the aqueous treatment of leather to impart durable antimicrobial properties thereto ([0013; 0020; 0040-0041; 0054]). The method comprises cleaning the leather ([0015]); a first soaking of the leather in an antimicrobial composition ([0013; 0015-0016; 0020; 0022-0025; 0032-0035; 0040-0042]) including a biguanide bactericide ([0018]) and a fungicide ([0011-0012; 0016-0017; 0019; 0024; 0052-0054]), each of which can be present in a specific ratio range ([0017; 0024; 0032; 0039; 0046-0047; 0052; 0054]); a first soaking of the leather in fat liquors ([0021-0025; 0032]); soaking the leather in an aqueous solution containing a tanning agent ([0020-0023]); and rinsing the leather ([0020-0023; 0028; 0031; 0036; 0040-0042]). The first soaking of the leather in an antimicrobial composition can occur before the first fatliquoring ([0020-0024]) or concurrently with the first fatliquoring ([020-0024].

Claim 45 recites a method for making a durably antimicrobial leather ([0011-0013]). A cleaned leather is first soaked in an antimicrobial composition in the presence of an emulsifier ([0021; 0040-0043]). The antimicrobial composition includes a biguanide bactericide ([0018]) having a concentration in the composition of about 500 ppm to about 10,000 ppm based on the weight of the leather ([0017; 0032; 0039; 0046-0047; 0052-0054]), and a fungicide ([0011-0012; 0016-0017; 0019; 0024; 0052-0054]) having a concentration in the composition of about 200 ppm to about 5,000 ppm based on the weight of the leather ([0017; 0032; 0039; 0046-0047; 0052-0054]). The biguanide bactericide and fungicide are present in the composition in a ratio between about 1:50 to about 10:1 fungicide to biguanide bactericide ([0017; 0052-0054]). A first fatliquoring of the leather in a first fat liquor is performed ([0021-0025; 0032]). The first soaking of the leather in an antimicrobial composition can occur before the first fatliquoring ([0020-0024]) or concurrently with the first fatliquoring ([020-0024]).

Claim 62 calls out a method for making a durably antimicrobial leather. The method comprises a first soaking of a cleaned leather in an antimicrobial composition ([0011-0013]) in the presence of an emulsifier ([0021; 0040-0043]). The antimicrobial composition of claim 62 includes isothiazolinone ([0018]) having a concentration in the composition of about 500 ppm to about 10,000 ppm based on the weight of the leather ([0017; 0032; 0039; 0046-0047; 0052-0054]), and a fungicide ([0011-0012; 0016-0017; 0019; 0024; 0052-0054]) having a concentration in the composition of about 200 ppm to about 5,000 ppm based on the weight of the leather ([0017; 0032; 0039; 0046-0047; 0052-0054]), wherein the isothiazolinone and fungicide are present in the composition in a ratio between about 50:1 to about 1:5 fungicide to isothiazolinone ([0017; 0052-0054]). The cleaned leather undergoes a first fatliquoring of the leather in a first fat liquor ([0021-0025; 0032]). The first soaking of the leather in an antimicrobial composition can occur before the first fatliquoring ([0020-0024]) or concurrently with the first fatliquoring ([020-0024]).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Whether claims 23-28, 31-35, 37-39, 41, 44-47, 50-53, 55, 58-65 and 68 are unpatentable under 35 U.S.C. § 103(a) over Pillay, USP 6,110,950 in view of Austin, USP 5,290,810.

B. Whether claims 42-43, 56-57, and 66-67 are unpatentable under 35 U.S.C. § 103(a) over Pillay '950 in view of Austin '810 and further in view of Rother et al., USP 5,888,415.

C. Whether claims 40 and 54 are unpatentable under 35 U.S.C. § 103(a) over Pillay '950 in view of Austin '810 and in further view of Lindner et al., USP 6,228,382.

D. Whether claim 49 is unpatentable under 35 U.S.C. § 103(a) over Pillay '950 in view of Austin '810 and in further view of Bryant et al., USP 5,087,457.

VII. ARGUMENT

A. Whether claims 23-28, 31-35, 37-39, 41, 44-47, 50-53, 55, 58-65 and 68 are unpatentable under 35 U.S.C. § 103(a) over Pillay, USP 6,110,950 in view of Austin, USP 5,290,810.

A.1. Claims 23-28, 31, 34-35, 37-39 and 44.

For purposes of this specific rejection, claims 23-28, 31, 34-35, 37-39 and 44 rise or fall with the decision as to independent claim 23. Claims 45-47, 50-51 and 58-61 rise or fall with the decision as to independent claim 45.

In relevant part, claim 23 recites a method including treatment with an antimicrobial composition comprising a biguanide bactericide and a fungicide present in a ratio between about 1:50 to about 10:1 fungicide to biguanide bactericide.

Appellant concedes that where a reference teaches a simple combination, the components of that simple combination are susceptible of substitution by like chemicals or by dissimilar components if such substitutions are taught or suggested. However, Appellant asserts that a synergistic combination is not a simple combination; it is one with peculiar and non-cumulative properties unforeseen by those of skill in the art. (Accord MPEP § 716.02(a).) Synergistic combinations are unexpected; for Pillay '950, this characteristic means (a) the synergistic combination is the essential feature of the invention, and (b) loss of the synergism—through, e.g., separation of the synergistic components—is discouraged.

When a reference discloses a synergistic combination, then, one of ordinary skill understands that the components of that combination cannot be substituted without a teaching or suggestion that the synergism would be subsequently retained. To be clear, Appellant does not say that substitution is never permitted; merely that a substitution which is not expected to preserve the synergism—and thus, the principle of operation of the prior art invention—is proscribed and would not be carried out by the ordinarily skilled artisan. Stated in the alternative, one of ordinary skill in the art instead would be led away from separation of a synergistic combination and substitution for a component thereof, absent a specific teaching or suggestion in the reference that such separation/substitution would not disturb the synergism. See *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959); *accord* MPEP 2143.01(VI) ("If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious.").

Turning now to the specifics of the rejection, Pillay '950 discloses a synergistic antimicrobial combination (propiconazole and 2-mercaptobenzothiazole, widely regarded as a fungicide and a bactericide, respectively). (Pillay '950, *passim.*) The background of the reference makes clear that others had tried antimicrobial agents in leather treatments; the substance of the Pillay '950 teaching lies in its synergistic antimicrobial combination.

A substitution of one of the components of the synergistic combination of Pillay '950, as is done by the Examiner in formulating the rejection, would be expected by those of skill in the art to destroy the synergism discovered by Pillay in the combination. Pillay '950 itself teaches:

"Only synergism, which is much less likely than an additive or an antagonistic effect, gives a positive result ..." (Pillay '950, column 3, lines 5-7 (underlining added).) As a first matter, Pillay '950 therefore teaches away from substitutions that do not suggest maintenance of the synergism. One of skill nonetheless would not be motivated to undertake substitutions to the Pillay combination unless the "synergism," "positive result," and "economic advantage" were preserved. In the alternative, any such substitution must be taught or suggested in the prior art, else the asserted substitution would "change the principle of operation of the prior art invention being modified" and the references fail to establish a *prima facie* case of obviousness.

Appellant asserts, and the Examiner has admitted, that Pillay '950 alone provides no teaching or suggestion to substitute a biguanide compound for the 2-mercaptobenzothiazole. The Examiner cited Austin '810 to provide the missing suggestion of substitution without disruption of the synergism of Pillay. Austin '810 discloses biguanides in the treatment of leather, but fails to suggest the use of the recited combination therefor. One of ordinary skill would not interpret Austin '810 as suggesting interchangeability of Pillay '950's synergistic components with any hint of preservation of synergism; Austin '810 provides no reassurance that substitutions to the 2-mercaptobenzothiazole of Pillay '950 will retain the synergism of that reference's disclosed combination.

To get over this hurdle, the Examiner asserted that one would find motivation to substitute the polyhexamethylene biguanide of Austin '810 (mentioned at column 6, lines 21-22) for the 2-mercaptobenzothiazole of Pillay '950 in the "functional equivalence of these compounds." "Functional equivalence" provides no expectation of synergism. It is respectfully submitted that if "functional equivalence" were a valid basis for motivation, any antimicrobial agent could be substituted for 2-mercaptobenzothiazole and expected to yield a synergistic effect, merely by virtue of its shared functionality. Applied to its full extent, this "functional equivalence" standard renders all substitutions obvious, without regard for the organic/inorganic natures, solubilities, pH tolerances, and all other chemical and physical parameters of the compounds.

This standard is at odds with the art itself, which is regarded as generally unpredictable and in which skilled artisans are guided by the chemical profiles of the compounds of interest. While functional equivalence may have a value, it cannot override chemical incompatibilities or the clear teachings of the references.

In reality, when two compounds are mixed, synergism is possible but commonly unexpected. As Pillay '950 explains:

> "When two chemical microbiocides are used in combination, either in a single composition or as two separate additions at the point of use, three results are possible: 1) an additive (neutral) effect; 2) an antagonistic effect; or 3) a synergistic effect. (Pillay '950, column 2, line 65 to column 3, line 2 (italics added).) It is known in the art that synergism "is much less likely than an additive or an antagonistic effect ..." (Pillay '950, column 3, lines 5-6.)

Austin '810 can suggest a substitution to one-half of the synergistic Pillay '950 combination only if the substitution would produce a synergistic result; else, the principle of operation of the Pillay '950 invention is lost and the teaching of Pillay '950 (to preserve synergism) is discarded. Austin '810 lacks this suggestion. It should be noted that

polyhexamethylene biguanide and 2-mercaptobenzothiazole have markedly different chemical properties and would not be seen by the ordinarily skilled artisan as chemically equivalent.

The Examiner further incorrectly characterizes as Austin '810 as teaching "treating leather with biocidal compounds for improved antibacterial properties, wherein the compounds comprise isothiazolines, quaternary ammonium compounds, polyhexamethylene biguanide, mercaptobenzothiazole and diiodomethyl-paratolylsulfone. (Final Office Action, page 3.)

More correctly, Austin '810 teaches that its "compound of the general formula I" is a required element of its antimicrobial leather treatment composition (Austin '810, column 5, lines 16-17) and then lists supplemental compounds which may be used in addition to the antimicrobial composition of General Formula I. (Austin '810, column 5, lines 16-17 ("The compounds of general formula I may be the only biologically active compounds of the composition of the present invention or the composition may comprise further compounds having antimicrobial characteristics.").) The reference in no way teaches or fairly suggests that polyhexamethylene biguanide can be used separate from the composition of General Formula I in effectively treating leather to confer an antimicrobial property thereto, alone or paired with further unspecified compounds.

For these reasons, one of ordinary skill would not interpret Austin '810 as suggesting the modification of Pillay '950 proffered by the Examiner. The references, alone or together, fail to support a *prima facie* case of obviousness as to either of claim 23 or to claims depending therefrom.

A.2. Claims 45-47, 50-51 and 58-61.

For purposes of this specific rejection, claims 45-47, 50-51 and 58-61 rise or fall with the decision as to independent claim 45.

In relevant part, claim 45 recites a method including treatment with an antimicrobial composition comprising a biguanide bactericide and a fungicide present in a ratio between about 1:50 to about 10:1 fungicide to biguanide bactericide.

Appellant repeats in full its previous remarks of Section A.1 regarding the prior art teachings.

For these reasons, one of ordinary skill would not interpret Austin '810 as suggesting the modification of Pillay '950 proffered by the Examiner. The references, alone or together, fail to support a *prima facie* case of obviousness as to either of claim 45 or to claims depending therefrom.

A.3. Claim 32.

Claim 32, depending from independent Claim 23, places a limitation on the fungicide that it be selected from the group consisting of tolyldiiodomethylsulfone, zinc 2-pyridinethiol-1-oxide, propiconazole, thiabendazole, and tebuconazole.

Appellant repeats in full its previous remarks of Section A.1 regarding the prior art teachings.

Austin '810 likewise lacks the missing suggestion of substitution with maintenance of the synergism of Pillay for claim 32. To those remarks, Appellant adds that Pillay '950 alone provides no teaching or suggestion to substitute for 2-mercaptobenzothiazole any of the fungicides recited in claim 32. Mere assertion of "functional equivalence" of 2-

mercaptobenzothiazole of Pillay '950 with any of tolyldiiodomethylsulfone, zinc 2-pyridinethiol-1-oxide, propiconazole, thiabendazole, or tebuconazole—which equivalence is not admitted herein—is insufficient to suggest ready substitution without damage to the principle of operation of the invention of Pillay '950.

For the above reasons, Claim 32 is allowable over the cited combination, as are the claims depending therefrom.

A.4. Claim 52.

Claim 52, depending from independent Claim 45, places a limitation on the fungicide that it be selected from the group consisting of tolyldiiodomethylsulfone, zinc 2-pyridinethiol-1-oxide, propiconazole, thiabendazole, and tebuconazole.

Appellant repeats in full its previous remarks of Section A.1 regarding the prior art teachings.

Austin '810 likewise lacks the missing suggestion of substitution with maintenance of the synergism of Pillay for claim 52. To those remarks, Appellant adds that Pillay '950 alone provides no teaching or suggestion to substitute for 2-mercaptobenzothiazole any of the fungicides recited in claim 52. Mere assertion of "functional equivalence" of 2-mercaptobenzothiazole of Pillay '950 with any of tolyldiiodomethylsulfone, zinc 2-pyridinethiol-1-oxide, propiconazole, thiabendazole, or tebuconazole —which equivalence is not admitted herein—is insufficient to suggest ready substitution without damage to the principle of operation of the invention of Pillay '950.

For the above reasons, Claim 52 is allowable over the cited combination, as are the claims depending therefrom.

A.5. Claim 33.

Claim 33 places a limitation on the fungicide that it be tolyldiiodomethylsulfone.

Appellant repeats in full its previous remarks of Section A.1 regarding the prior art teachings.

Austin '810 likewise lacks the missing suggestion of substitution with maintenance of the synergism of Pillay for claims 33. To those remarks, Appellant adds that Pillay '950 alone provides no teaching or suggestion to substitute for 2-mercaptobenzothiazole any of: (a) the fungicides recited in claim 32; (b) tolyldiiodomethylsulfone; or (c) propiconazole. Mere assertion of "functional equivalence" of 2-mercaptobenzothiazole of Pillay '950 with any of tolyldiiodomethylsulfone—which equivalence is not admitted herein—is insufficient to suggest ready substitution without damage to the principle of operation of the invention of Pillay '950.

For the above reasons, Claim 33 is allowable over the cited combination.

A.6. Claim 53.

Claim 53 places a limitation on the fungicide that it be tolyldiiodomethylsulfone.

Appellant repeats in full its previous remarks of Section A.1 regarding the prior art teachings.

Austin '810 likewise lacks the missing suggestion of substitution with maintenance of the synergism of Pillay for claim 53. To those remarks, Appellant adds that Pillay '950 alone provides no teaching or suggestion to substitute tolyldiiodomethylsulfone for 2-

mercaptobenzothiazole. Mere assertion of "functional equivalence" of 2-mercaptobenzothiazole of Pillay '950 with tolyldiiodomethylsulfone—which equivalence is not admitted herein—is insufficient to suggest ready substitution without damage to the principle of operation of the invention of Pillay '950.

For the above reasons, Claim 53 is allowable over the cited combination.

A.7. Claim 41.

Claim 41 places a limitation on the fungicide that it be propiconazole.

Appellant repeats in full its previous remarks of Section A.1 regarding the prior art teachings.

Austin '810 likewise lacks the missing suggestion of substitution with maintenance of the synergism of Pillay for claims 41. To those remarks, Appellant adds that Pillay '950 alone provides no teaching or suggestion to substitute for 2-mercaptobenzothiazole any of: (a) the fungicides recited in claim 32; (b) tolyldiiodomethylsulfone; or (c) propiconazole. Mere assertion of "functional equivalence" of 2-mercaptobenzothiazole of Pillay '950 with propiconazole—which equivalence is not admitted herein—is insufficient to suggest ready substitution without damage to the principle of operation of the invention of Pillay '950.

For the above reasons, Claim 41 is allowable over the cited combination.

A.8. Claim 55.

Claim 55 places a limitation on the fungicide that it be propiconazole.

Appellant repeats in full its previous remarks of Section A.1 regarding the prior art teachings.

Austin '810 likewise lacks the missing suggestion of substitution with maintenance of the synergism of Pillay for claim 55. To those remarks, Appellant adds that Pillay '950 alone provides no teaching or suggestion to substitute propiconazole for 2-mercaptobenzothiazole. Mere assertion of "functional equivalence" of 2-mercaptobenzothiazole of Pillay '950 with propiconazole—which equivalence is not admitted herein—is insufficient to suggest ready substitution without damage to the principle of operation of the invention of Pillay '950.

For the above reasons, Claim 55 is allowable over the cited combination.

A.9. Claims 62 and 68.

For purposes of this specific rejection, claims 62 and 68 rise or fall with the decision as to independent claim 62.

In relevant part, claim 62 recites a method including application of an antimicrobial composition comprising isothiazolinone and a fungicide, wherein the isothiazolinone (having a concentration of about 500 ppm to about 10,000 ppm) and the fungicide (about 200 ppm to about 5,000 ppm) (both based on the weight of the leather) are present in a ratio between about 50:1 to about 1:5 isothiazolinone to fungicide. The leather is exposed to this antimicrobial composition prior to or concurrent with a first fatliquoring step.

Appellant repeats in full its previous remarks of Section A.1 regarding the prior art teachings.

Austin '810 likewise lacks the missing suggestion of substitution with maintenance of the synergism of Pillay for claims 62-68. To those remarks, Appellant adds that Pillay '950 provides

no teaching or suggestion of isothiazolinone nor any chemical parallels between isothiazolinone and 2-mercaptobenzothiazole. Again, Mere assertion of "functional equivalence" of 2-mercaptobenzothiazole of Pillay '950 with isothiazolinone is insufficient to suggest ready substitution without damage to the principle of operation of the invention of Pillay '950.

For the above reasons, Claims 62 and 68 are allowable over the cited combination, as are the claims depending therefrom.

A.10. Claim 63.

Claim 63, depending from base Claim 62, places a limitation on the fungicide that it be selected from the group consisting of tolyldiiodomethylsulfone, zinc 2-pyridinethiol-1-oxide, propiconazole, thiabendazole, and tebuconazole.

Appellant repeats in full its previous remarks of Section A.1 regarding the prior art teachings.

Austin '810 likewise lacks the missing suggestion of substitution with maintenance of the synergism of Pillay for claim 63.

Appellant notes again that Pillay '950 provides no teaching or suggestion to substitute for 2-mercaptobenzothiazole any of the fungicides recited in Claim 63.

As before, Appellant repeats that Mere assertion of "functional equivalence," to the extent such function is loosely defined as exhibiting an antimicrobial, antifungal, or antibacterial activity, of 2-mercaptobenzothiazole of Pillay '950 with any of tolyldiiodomethylsulfone, zinc 2-pyridinethiol-1-oxide, propiconazole, thiabendazole, or tebuconazole—which equivalence is not admitted herein—is insufficient to suggest ready substitution without damage to the principle of operation of the invention of Pillay '950.

For the above reasons, Claim 63 is allowable over the cited combination, as are the claims depending therefrom.

A.11. Claim 64.

Claim 64, depending from base Claim 62 by way of Claim 63, places a limitation on the fungicide that it be tolyldiiodomethylsulfone.

Appellant repeats in full its previous remarks of Section A.1 regarding the prior art teachings.

Austin '810 likewise lacks the missing suggestion of substitution with maintenance of the synergism of Pillay for claim 64.

Appellant notes again that Pillay '950 provides no teaching or suggestion to substitute tolyldiiodomethylsulfone for 2-mercaptobenzothiazole.

As before, Appellant repeats that Mere assertion of "functional equivalence," to the extent such function is loosely defined as exhibiting an antimicrobial, antifungal, or antibacterial activity, of 2-mercaptobenzothiazole of Pillay '950 with tolyldiiodomethylsulfone—which equivalence is not admitted herein—is insufficient to suggest ready substitution without damage to the principle of operation of the invention of Pillay '950.

For the above reasons, Claim 64 is allowable over the cited combination, as are the claims depending therefrom.

A.12. Claim 65.

Claim 65, depending from base Claim 62 by way of Claim 63, places a limitation on the fungicide that it be propiconazole.

Appellant repeats in full its previous remarks of Section A.1 regarding the prior art teachings.

Austin '810 likewise lacks the missing suggestion of substitution with maintenance of the synergism of Pillay for claim 65.

Appellant notes again that Pillay '950 provides no teaching or suggestion to substitute propiconazole for 2-mercaptobenzothiazole.

As before, Appellant repeats that Mere assertion of "functional equivalence," to the extent such function is loosely defined as exhibiting an antimicrobial, antifungal, or antibacterial activity, of 2-mercaptobenzothiazole and propiconazole—which equivalence is not admitted herein—is insufficient to suggest ready substitution without damage to the principle of operation of the invention of Pillay '950.

For the above reasons, Claim 65 is allowable over the cited combination, as are the claims depending therefrom.

B. Whether claims 42-43, 48, 56-57, and 66-67 are unpatentable under 35 U.S.C. § 103(a) over Pillay '950 in view of Austin '810 and further in view of Rother, USP 5,888,415.

B.1. Claim 48.

No argument is presented herein in support of Claim 48, which claim Appellant cancels.

B.2. Claim 42.

Claim 42 depends from independent Claim 23 and adds the limitations that the fungicide (paired with the biguanide bactericide) be thiabendazole.

Appellant repeats in full its previous remarks of Section A.1 regarding the prior art teachings. Pillay '950 is quite clear in its focus on propiconazole and contains no mention of thiabendazole.

The Examiner concedes that Pillay '950 and Austin '810 do not teach methods comprising thiabendazole, tebuconazole, and triclosan. Certainly, it can also be concluded that these two references must also fail to provide any teaching or fair suggestion that the synergism of Pillay '950 will be preserved if the substance of Claim 42 is substituted for one-half of the Pillay '950 synergistic combination.

Rother '415 is asserted to provide the missing suggestion of thiabendazole in place of the propiconazole of Pillay '950. But again, Rother '415 fails to teach or fairly suggest that any synergism of Pillay'950 would be preserved upon such substitution. Absent that teaching or suggestion, one of ordinary skill is taught by Pillay '950 that "[o]nly synergism ... gives a positive result" and therefore would not undertake the asserted substitution.

"Functional equivalence" of propiconazole and thiabendazole—any chemical or physical equivalence between which is disputed—does not provide sufficient motivation to overcome the teaching-away of Pillay '950, the unpredictability of the art, or the absence of any teaching of a reasonable expectation that Pillay's synergism would be retained.

The references together fails to present a *prima facie* case of obviousness, and Claim 42 is allowable over them.

B.3. Claim 43.

Claim 43 depends from independent Claim 23 and adds the limitations that the fungicide (paired with the biguanide bactericide) be tebuconazole.

Appellant repeats in full its previous remarks of Section A.1 regarding the prior art teachings. Pillay '950 is quite clear in its focus on propiconazole and contains no mention of tebuconazole.

The Examiner concedes that Pillay '950 and Austin '810 do not teach methods comprising thiabendazole, tebuconazole, and triclosan. Certainly, it can also be concluded that these two references must also fail to provide any teaching or fair suggestion that the synergism of Pillay '950 will be preserved if tebuconazole is substituted for one-half of the Pillay '950 synergistic combination.

Rother '415 is asserted to provide the missing suggestion of tebuconazole in place of the propiconazole of Pillay '950. But again, Rother '415 fails to teach or fairly suggest that any synergism of Pillay'950 would be preserved upon such substitution. Absent that teaching or suggestion, one of ordinary skill is taught by Pillay '950 that "[o]nly synergism ... gives a positive result" and therefore would not undertake the asserted substitution.

"Functional equivalence" does not provide sufficient motivation to overcome the teaching-away of Pillay '950, the unpredictability of the art, or the absence of any teaching of a reasonable expectation that Pillay's synergism would be retained. Appellant disputes that sufficient chemical similarities exist between propiconazole and tebuconazole to fairly suggest a reasonable expectation of synergism upon substitution in the Pillay '950 composition.

The references together fails to present a *prima facie* case of obviousness, and Claim 43 is allowable over them.

B.4. Claim 56.

Claim 56, depending ultimately from Claim 45, recites that the fungicide be thiabendazole.

Appellant repeats in full its previous remarks of Section A.1 regarding the prior art teachings.

Austin '810 likewise lacks the missing suggestion of substitution with maintenance of the synergism of Pillay for claim 56.

To those remarks, Appellant reiterates its remarks, supra at Section B.1, that Rother '415 provides no valid teaching or suggestion to substitute thiabendazole for 2-mercaptobenzothiazole. Rother '415 therefore cannot provide any teaching or suggestion that the synergism of Pillay '950 would be preserved subsequent to a substitution of thiabendazole for 2-mercaptobenzothiazole. Thiabendazole is chemically distinct from 2-mercaptobenzothiazole and provide no guidance to one of ordinary skill in the art that substitution offers a reasonable expectation of success or synergism. Appellant reiterates its comments, supra, regarding the Examiner's "functional equivalence" assertion.

For the above reasons, Claim 56 is allowable over the cited combination.

B.5. Claim 57.

Claim 57, depending ultimately from Claim 45, recites that the fungicide be tebuconazole.

Appellant repeats in full its previous remarks of Section A.1 regarding the prior art teachings.

Austin '810 likewise lacks the missing suggestion of substitution with maintenance of the synergism of Pillay for claim 57.

To those remarks, Appellant reiterates its remarks, supra at Section B.1, that Rother '415 provides no valid teaching or suggestion to substitute tebuconazole for 2-mercaptobenzothiazole. Rother '415 therefore cannot provide any teaching or suggestion that the synergism of Pillay '950 would be preserved subsequent to a substitution of tebuconazole for 2-mercaptobenzothiazole. Tebuconazole is chemically distinct from 2-mercaptobenzothiazole and provide no guidance to one of ordinary skill in the art that substitution offers a reasonable expectation of success or synergism. Appellant reiterates its comments, supra, regarding the Examiner's "functional equivalence" assertion.

For the above reasons, Claim 57 is allowable over the cited combination.

B.6. Claim 66.

Claim 66, depending ultimately from Claim 62, recites that the fungicide be thiabendazole.

Appellant repeats in full its previous remarks of Section A.1 regarding the prior art teachings.

Austin '810 likewise lacks the missing suggestion of substitution with maintenance of the synergism of Pillay for claim 66.

To those remarks, Appellant reiterates its remarks, supra at Section B.1, that Rother '415 provides no valid teaching or suggestion to substitute thiabendazole for 2-mercaptobenzothiazole. Rother '415 therefore cannot provide any teaching or suggestion that the synergism of Pillay '950 would be preserved subsequent to a substitution of thiabendazole for 2-mercaptobenzothiazole. Thiabendazole is chemically distinct from 2-mercaptobenzothiazole and provide no guidance to one of ordinary skill in the art that substitution offers a reasonable expectation of success or synergism. Appellant reiterates its comments, supra, regarding the Examiner's "functional equivalence" assertion.

For the above reasons, Claim 66 is allowable over the cited combination.

B.7. Claim 67.

Claim 67, depending ultimately from Claim 62, recite that the fungicide be tebuconazole.

Appellant repeats in full its previous remarks of Section A.1 regarding the prior art teachings.

Austin '810 likewise lacks the missing suggestion of substitution with maintenance of the synergism of Pillay for claim 67.

To those remarks, Appellant reiterates its remarks, supra at Section B.1, that Rother '415 provides no valid teaching or suggestion to substitute tebuconazole for 2-mercaptobenzothiazole. Rother '415 therefore cannot provide any teaching or suggestion that the synergism of Pillay '950 would be preserved subsequent to a substitution of tebuconazole for 2-mercaptobenzothiazole.

Tebuconazole is chemically distinct from 2-mercaptobenzothiazole and provide no guidance to one of ordinary skill in the art that substitution offers a reasonable expectation of success or synergism. Appellant reiterates its comments, supra, regarding the Examiner's "functional equivalence" assertion.

For the above reasons, Claim 67 is allowable over the cited combination.

C. Whether claims 40 and 54 are unpatentable under 35 U.S.C. § 103(a) over Pillay '950 in view of Austin '810 and in further view of Lindner et al., USP 6,228,382.

C.1. Claim 40.

Claim 40, depending from independent Claim 23, recites a method which includes treatment with an antimicrobial composition comprising a biguanide bactericide and zinc 2-pyridinethiol-1-oxide (fungicide) present in a ratio between about 1:50 to about 10:1 fungicide to biguanide bactericide.

As above, the Examiner concedes that neither Pillay '950 nor Austin '810 teach a method comprising zinc 2-pyridinethiol-1-oxide. Lindner '382 is asserted to teach treatment of leather with zinc 2-pyridinethiol-1-oxide to achieve antimicrobial benefits.

Appellant repeats in full its previous remarks of Section A.1 regarding the prior art teachings.

Austin '810 likewise lacks the missing suggestion of substitution with maintenance of the synergism of Pillay for claim 40.

Appellant notes that the rejection now advances further in substituting both components of the Pillay '950 composition: Austin '810 is asserted as the basis for interchange of Appellant's biguanide bactericide for Pillay's 2-mercaptobenzothiazole; and Lindner '382 is asserted to support the interchange of Appellant's zinc 2-pyridinethiol-1-oxide for Pillay's propiconazole. The rejection has now wholly eliminated both Pillay '950's synergistic composition and its operating principle. It bears emphasis that the rejection has taken a synergistic composition and, in direct conflict with a disclosure urging maintenance of its synergism, substituted both elements thereof with chemically dissimilar compounds. Such a result runs afoul of *Ratti* and MPEP 2143.01(VI).

Appellant additionally notes the different chemical properties of (a) biguanide bactericide and 2-mercaptobenzothiazole; and (b) zinc 2-pyridinethiol-1-oxide and propiconazole. Basic chemical differences obviate any reasonable expectation of successful preservation of synergism and militate against a "functional equivalence" rationale for ready substitution.

The cited references therefore fail to establish a *prima facie* case of obviousness as to Claim 40.

C.2. Claim 54.

Claim 54, depending from independent Claim 45 via dependent Claim 52, recites a method which includes treatment with an antimicrobial composition comprising a biguanide bactericide and zinc 2-pyridinethiol-1-oxide (fungicide) present in a ratio between about 1:50 to about 10:1 fungicide to biguanide bactericide. The biguanide bactericide and fungicide have concentrations in the composition of about 500 ppm to about 10,000 ppm and about 200 ppm to

about 5,000 ppm, respectively, both ranges based on the weight of the leather.

As above, the Examiner concedes that neither Pillay '950 nor Austin '810 teach a method comprising zinc 2-pyridinethiol-1-oxide. Lindner '382 is asserted to teach treatment of leather with zinc 2-pyridinethiol-1-oxide to achieve antimicrobial benefits.

Appellant repeats in full its previous remarks of Section A.1 regarding the prior art teachings.

Austin '810 likewise lacks the missing suggestion of substitution with maintenance of the synergism of Pillay for claim 40.

Appellant notes that the rejection now advances further in substituting both components of the Pillay '950 composition: Austin '810 is asserted as the basis for interchange of Appellant's biguanide bactericide for Pillay's 2-mercaptobenzothiazole; and Lindner '382 is asserted to support the interchange of Appellant's zinc 2-pyridinethiol-1-oxide for Pillay's propiconazole. The rejection has now wholly eliminated both Pillay '950's synergistic composition and its operating principle. It bears emphasis that the rejection has taken a synergistic composition and, in direct conflict with a disclosure urging maintenance of its synergism, substituted both elements thereof with chemically dissimilar compounds. Such a result runs afoul of *Ratti* and MPEP 2143.01(VI).

Appellant additionally notes the different chemical properties of (a) biguanide bactericide and 2-mercaptobenzothiazole; and (b) zinc 2-pyridinethiol-1-oxide and propiconazole. Basic chemical differences obviate any reasonable expectation of successful preservation of synergism and militate against a "functional equivalence" rationale for ready substitution.

The cited references therefore fail to establish a *prima facie* case of obviousness as to Claim 54.

D. Whether claim 49 is unpatentable under 35 U.S.C. § 103(a) over Pillay '950 in view of Austin '810 and in further view of Bryant et al., USP 5,087,457.

Claims 49, depending from Claim 45, places the limitation on the antimicrobial composition of the method that it further comprise poly(oxyethylene-(dimethylimino)ethylene(dimethylimino)ethylenedichloride) (commonly known as "BUSAN 77").

The Examiner admits that Pillay '950 and Austin '810 do not teach or suggest methods comprising BUSAN 77. Bryant '457 is asserted as teaching treatment of leather with BUSAN 77.

Appellant repeats in full its previous remarks of Section A.1 regarding the prior art teachings. Both references lack a teaching or fair suggestion of BUSAN 77 substitution with maintenance of the synergism of Pillay for claim 49. Relevant to base Claim 45, Bryant '457 likewise fails to provide a teaching or suggestion of substitution within the Pillay '950 composition with an expectation of synergism retention.

None of the three cited references can validly be combined to overcome the teaching of Pillay '950 that its combination not be perturbed unless the positive result of synergism is maintained. The addition of BUSAN 77 is of no avail on this matter.

Finally, Bryant '457 teaches BUSAN 77 in combination with a borate compound. The reference provides no teaching or suggestion of the use of BUSAN 77 as an adjunct to a biguanide bactericide and a fungicide.

Claim 49 therefore is allowable over the cited art.

VIII. CLAIMS APPENDIX

23. A method for aqueous treatment of leather, comprising:

cleaning the leather;

a first soaking of the leather in an antimicrobial composition in the presence of an emulsifier wherein the antimicrobial composition comprises a biguanide bactericide and a fungicide and wherein the fungicide and biguanide bactericide are present in the composition in a ratio between about 1:50 to about 10:1 fungicide to biguanide bactericide;

a first soaking of the leather in fat liquors and wherein the first soaking of the leather in an antimicrobial composition occurs prior to or concurrent with the first soaking of the leather in fat liquors;

soaking the leather in an aqueous solution containing a tanning agent; and

rinsing the leather.

24. The method according to claim 23, further comprising:

a second soaking of the leather in fat liquors; and

a second soaking of the leather in an antimicrobial composition;

wherein the second soaking of the leather in an antimicrobial composition occurs prior to or concurrent with the second soaking of the leather in fat liquors.

25. The method according to claim 24 further comprising:

rinsing the leather between the first soaking in fat liquors and the second soaking in fat liquors.

26. The method according to claim 23 wherein soaking the leather in an aqueous solution of tanning agent occurs prior to the first soaking of the leather in an antimicrobial composition.

27. The method according to claim 23 wherein soaking the leather in an aqueous solution of tanning agent occurs after the first soaking of the leather in an antimicrobial composition.

28. The method according to claim 23 wherein the fungicide is present in the antimicrobial composition between about 200 ppm and about 5,000 ppm, and the biguanide bactericide is present in the composition between about 500 ppm and about 10,000 ppm.

31. The method according to claim 23 wherein the biguanide bactericide is polyhexamethylene biguanide.

32. The method according to claim 23 wherein the fungicide is selected from the group consisting of tolyldiiodomethylsulfone, zinc 2-pyridinethiol-1-oxide, propiconazole, thiabendazole, and tebuconazole.

33. The method according to claim 23 wherein the fungicide is tolyldiiodomethylsulfone.

34. The method according to claim 23 wherein first soaking of the leather in the antimicrobial composition comprises exhausting the fungicide and bactericide into the interior of the leather.

35. The method according to claim 23 wherein the leather is soaked in the antimicrobial composition for a time sufficient to exhaust at least 1000 ppm of the fungicide and at least 1000 ppm of the bactericide into the leather.

37. The method according to claim 23, further comprising:

finishing the leather.

38. The method according to claim 37, further comprising forming a product from the finished leather.

39. The method according to claim 38 wherein the product is a clothing article, a shoe, a boot, a coat, baggage, a clothing accessory, a tent, outdoor equipment, or upholstery.

40. The method according to claim 23 wherein the fungicide is zinc 2-pyridinethiol-1-oxide.

41. The method according to claim 23 wherein the fungicide is propiconazole.

42. The method according to claim 23 wherein the fungicide is thiabendazole.

43. The method according to claim 23 wherein the fungicide is tebuconazole.

44. The method according to claim 23 wherein the fungicide and biguanide bactericide are present in the composition in a ratio between about 1:50 to about 5:1 fungicide to biguanide bactericide.

45. A method for making an antimicrobial leather, comprising:

a first soaking of a cleaned leather in an antimicrobial composition in the presence of an emulsifier, wherein the antimicrobial composition includes:

a biguanide bactericide having a concentration in the composition of about 500 ppm to about 10,000 ppm based on the weight of the leather, and

a fungicide having a concentration in the composition of about 200 ppm to about 5,000 ppm based on the weight of the leather,

wherein the biguanide bactericide and fungicide are present in the composition in a ratio between about 1:50 to about 10:1 fungicide to biguanide bactericide;

a first fatliquoring of the leather in a first fat liquor; and

wherein the first soaking of the leather in an antimicrobial composition occurs prior to or concurrent with the first fatliquoring.

46. The method of claim 45, further comprising:

a second fatliquoring of the leather in a second fat liquor; and

a second soaking of the leather in the antimicrobial composition in the presence of an emulsifier;

wherein the second soaking of the leather in a second antimicrobial composition occurs prior to or concurrent with the second fatliquoring of the leather.

47. The method of claim 46 further comprising:

rinsing the leather between the first fatliquoring and the second fatliquoring.

49. The method of claim 45 wherein the antimicrobial composition further comprises poly(oxyethylene-(dimethylimino)ethylene(dimethylimino)ethylenedichloride).

50. The method of claim 45 wherein the antimicrobial composition further comprises isothiazolinone.

51. The method of claim 45 wherein the antimicrobial composition further comprises a quaternary ammonium compound.

52. The method of claim 45 wherein the fungicide is selected from the group consisting of tolyldiiodomethylsulfone, zinc 2-pyridinethiol-1-oxide, propiconazole, thiabendazole, and tebuconazole.

53. The method of claim 52 wherein the fungicide is tolyldiiodomethylsulfone.

54. The method of claim 52 wherein the fungicide is zinc 2-pyridinethiol-1-oxide.

55. The method of claim 52 wherein the fungicide is propiconazole.

56. The method of claim 52 wherein the fungicide is thiabendazole.

57. The method of claim 52 wherein the fungicide is tebuconazole.

58. The method of claim 45 wherein first soaking of the leather in the antimicrobial composition comprises exhausting the fungicide and biguanide bactericide into the interior of the leather.

59. The method of claim 45 wherein the fungicide and biguanide bactericide are present in the composition in a ratio between about 1:50 to about 5:1 fungicide to biguanide bactericide.

60. A leather article produced by the process of claim 44.

61. The method of claim 60 wherein the leather article is a clothing article, a shoe, a boot, a coat, baggage, a clothing accessory, a tent, an outdoor equipment, or upholstery.

62. A method for making an antimicrobial leather, comprising:

a first soaking of a cleaned leather in an antimicrobial composition in the presence of an emulsifier, wherein the antimicrobial composition includes:

isothiazolinone having a concentration in the composition of about 500 ppm to about 10,000 ppm based on the weight of the leather, and

a fungicide having a concentration in the composition of about 200 ppm to about 5,000 ppm based on the weight of the leather,

wherein the isothiazolinone and fungicide are present in the composition in a ratio between about 50:1 to about 1:5 isothiazolinone to fungicide;

a first fatliquoring of the leather in a first fat liquor; and

wherein the first soaking of the leather in an antimicrobial composition occurs prior to or concurrent with the first fatliquoring.

63. The method of claim 62 wherein the fungicide is selected from the group consisting of tolyldiiodomethylsulfone, zinc 2-pyridinethiol-1-oxide, propiconazole, thiabendazole, and tebuconazole.

64. The method of claim 63 wherein the fungicide is tolyldiiodomethylsulfone.

65. The method of claim 63 wherein the fungicide is propiconazole.

66. The method of claim 63 wherein the fungicide is thiabendazole.

67. The method of claim 63 wherein the fungicide is tebuconazole.

68. The method of claim 62 wherein first soaking of the leather in the antimicrobial composition comprises exhausting the fungicide and isothiazolinone into the interior of the leather.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.

CONCLUSION

For the foregoing reasons, Claims 23-28, 31-35 and 37-47 and 49-68 are allowable over the cited art. Appellant respectfully requests that the rejections be withdrawn and the application be advanced to allowance.

Respectfully submitted,

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